

B R E V I O R A

Museum of Comparative Zoology

CAMBRIDGE, MASS. 24 NOVEMBER, 1967

NUMBER 276

THE GENERIC RELATIONSHIPS OF THE AFRICAN SCINCID GENUS EUMECIA

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In 1870 Bocage described a new skink (*anchietae*) from Africa that was peculiar in having an elongate body form, small appendages with a reduced number of digits (2 fingers and 3 toes), a pair of supranasals meeting behind the rostral and a spectacle in the movable lower eyelid. Bocage placed the new species in a distinct genus which he named *Eumecia*, apparently to emphasize a similarity which he believed to exist with *Eumece*s.

The three subsequent revisionary studies on scincid genera rightly recognized the closer affinity of *Eumecia* with what have come to be called the lygosomine skinks rather than with *Eumece*s or its subfamily.¹

Boulenger (1887) placed *anchietae* in the *Riopa* section of the genus *Lygosoma*, and in 1897 described a species (*johnstoni*) from Nyasaland that was distinguishable from *anchietae* primarily on the basis of a further reduction in the number of digits (1 finger and 2 toes in *johnstoni*; 2 fingers and 3 toes in *anchietae*). Like *anchietae*, *johnstoni* was placed in the section *Riopa* of the genus *Lygosoma*.

Smith (1937) revived Bocage's name *Eumecia* for a subgenus of the genus *Riopa* and included in it only *anchietae* and *johnstoni*. Mittleman (1952) agreed with Smith's conception of the taxon *Eumecia* but gave it full generic rank in his classification.

Loveridge (1953 and 1957) placed both *anchietae* and *johnstoni* in the genus *Riopa* without recognizing subgenera, thus adopting

¹ The subfamily Lygosominae is characterized by a single frontal bone, and palatine bones which meet along the midline of the palate to form a secondary palate. *Eumece*s is considered to be a scincine, a subfamily characterized, in part, by a divided frontal bone, and palatines which do not meet along the ventral midline of the palate (Greer, MS).

a basically Boulengerian conception of the species' taxonomic position. The same author (1953) pointed out the very real possibility that *johnstoni* was simply a race of *anchietae* and further noted that some *anchietae* had three fingers instead of two.

That *anchietae* and *johnstoni* should be accorded separate superspecific rank as recognized by Bocage (1870), Smith (1937), and Mittleman (1952) is suggested by the fact that they are the only African lygosomine skinks with supranasals to have fewer than 5 fingers and 5 toes. Indeed it was on this criterion that *Eumecia* has been regarded as distinct from *Riopa* and its supposed relatives.

In this paper, the two closely related species *anchietae* and *johnstoni*¹ are considered to constitute a distinct genus *Eumecia*, for reasons that will become apparent in the following discussion, and the genus is shown to be most closely related to *Mabuya* and not *Riopa*. For the purposes of this discussion *Riopa* is understood in the sense of Smith's (1937) subgenus *Riopa* and Mittleman's (1952) genera *Riopa*, *Squamicilia* and *Mochlus* collectively. It is not clear to me why *Eumecia* was always thought by Boulenger and later authors to be more closely related to *Riopa* and its supposed relatives than to *Mabuya*. On the basis of externals there is no one character that will serve to distinguish all *Riopa* from all *Mabuya*. There is however one external character that will distinguish some *Mabuya* from all *Riopa*, namely the relative position of the prefrontal scales, and in this regard *Eumecia* is like *Mabuya* rather than *Riopa*. The prefrontals are never in contact in *Riopa*, but they do meet medially in *Eumecia* and in about one-third of the species of *Mabuya* (surveyed from Boulenger, 1887).

Comparisons of the skulls of 30 species of *Mabuya* and 13 species of *Riopa* indicate that there are important differences in skull morphology between *Mabuya* and *Riopa*, and on the basis of skull characters *Eumecia* is clearly more closely related to *Mabuya* than to *Riopa* (Table 1).

The single greatest difference between *Mabuya* and *Riopa* is in the relationships of the bones of the palate (Fig. 1). In both

¹ I have seen neither a skull nor an alcoholic specimen of *johnstoni*, which is still known only from the type. I am assuming throughout this paper that the two species are so similar (conspecific?) that, unless stated otherwise, observations made on the two skulls and alcoholic specimens of *anchietae* are also valid for *johnstoni*, and therefore for the whole genus *Eumecia*.

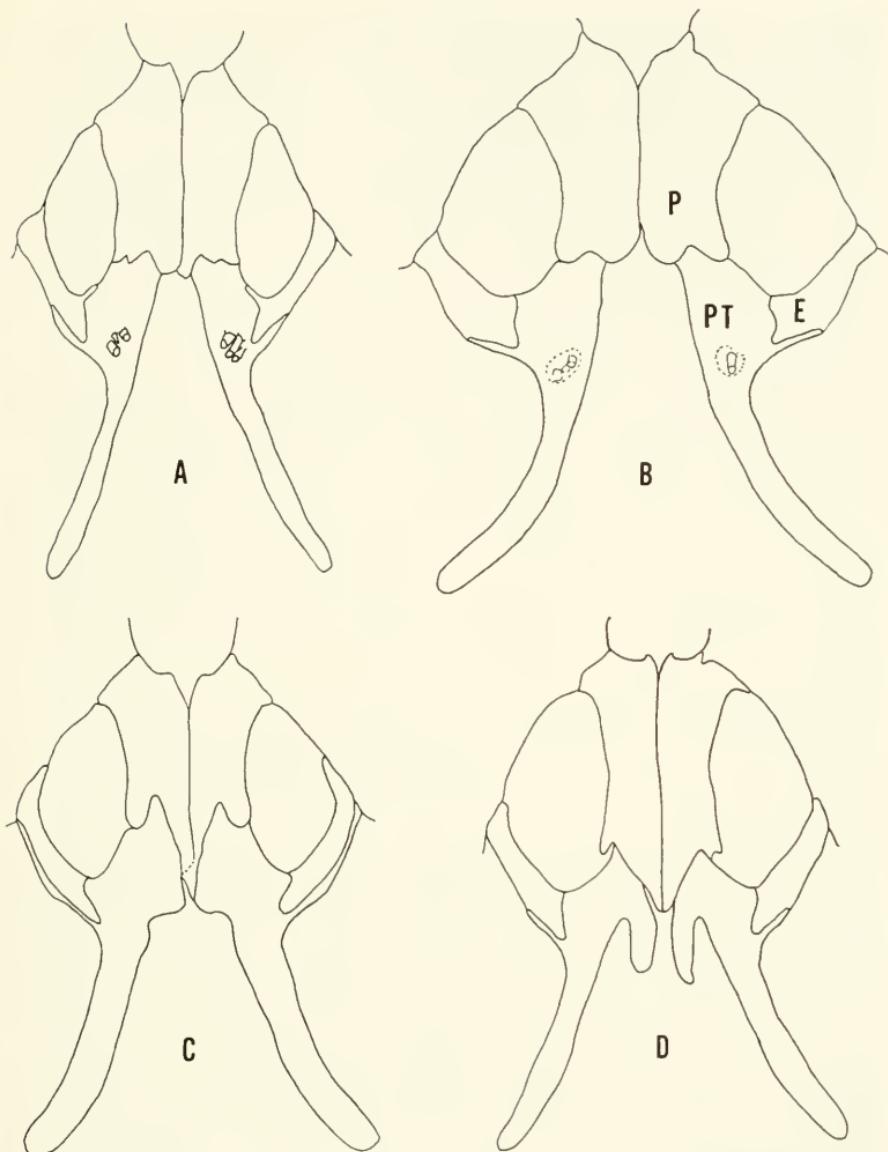


Figure 1. Ventral view of the secondary palate of: A) *Eumecia anchietae* (MCZ 41562), Kaimosi, Kakamega, Kenya; B) *Mabuya polytropis* (MCZ 8103), Krilii Cameroon; C) *Riopa punctata* (MCZ 3238), 70 miles SW of Amballa, India; D) *Leptosiaphos blochmanni* (untagged MCZ specimen), Upper Mulinga, Idjwi, Id., Congo. Abbreviations: E, ectopterygoid; P, palatine; PT, pterygoid. A and B drawn to one scale and C and D drawn to another scale.

Mabuya and *Riopa* the palatine bones meet along the ventral midline of the palate to form a secondary palate separating the air (above) and food (below) passages, a structure that is characteristic of the subfamily Lygosominae (Greer, MS). In *Riopa* the development of a secondary palate is more extensive than in *Mabuya* in that the palatal rami of the pterygoids approach but do not touch along the midline of the palate. The pterygoids are separated from each other by a pair of medial, posteriorly projecting processes from the palatines which are closely applied to the inner edges of the palatal rami and which themselves touch along the midline to close the gap between the pterygoids.

In *Mabuya*, on the other hand, and in *Eumecia*, the palatal rami of the pterygoids are widely separated and divergent, and there are no posteriorly projecting processes from the palatines (Fig. 1).

In *Eumecia* there is a broad suture between the prefrontal and nasal bones which thus separates the frontal from the maxilla. In 12 of the 23 species of *Mabuya* examined for this feature, the prefrontal articulates with the nasal, but in *Riopa* only 2 of the 12 species checked show a similar relationship of the prefrontal and nasal.

Similarly, *Eumecia* shows a short longitudinal series of pterygoid teeth, a feature shared with 17 of the 30 species of *Mabuya* examined for this character. However, *Riopa bowringi* was the only one of the 13 species of *Riopa* examined which was found to have pterygoid teeth.

Another somewhat statistical difference that aligns *Eumecia* with *Mabuya* is the number of teeth on the maxilla. The two specimens of *Eumecia anchietae* examined had 24-26 teeth on the maxilla. Only one species of *Mabuya (occidentalis)* of the 29 examined had fewer than 20 maxillary teeth; all others had 20 or more. Of the 13 species of *Riopa* examined for this character, however, only 4 species had 20 or more teeth on the maxilla.

The one significant similarity between *Riopa* and *Eumecia* in the gross morphology of the skull is in the common absence of the postorbital bone. *Eumecia anchietae* and the 13 species of *Riopa* examined lacked this bone while in all 29 species of *Mabuya* studied, a small, but discrete, postorbital bone was present. On the weight of the total evidence presented here, however, it would seem as if the postorbital of *Eumecia* had been lost independently of its loss in *Riopa*.

Although it seems established, on the basis of the evidence discussed above, that the relationships of *Eumecia* lie closer to *Mabuya* than to *Riopa*, it is still reasonable to ask if there might not

be a group even more closely related to *Eumecia* than is *Mabuya*.

In short, this does not seem to be the case. In Africa the only lygosomine skink which has the palatal rami of the pterygoids widely divergent and which lacks medial palatine processes projecting posteriorly as in *Mabuya* and *Eumecia* is *Ablepharus boutoni*, a relatively recent immigrant from the Australian Region. This species, however, lacks pterygoid teeth and supranasals which make it an unlikely representative of a stock ancestral to *Eumecia*.

In all African lygosomines other than *Mabuya*, *Eumecia* and *Ablepharus*, the palatal rami of the pterygoids are more closely apposed along the ventral midline of the palate, and medial palatine processes project posteriorly between the pterygoids. Indeed, in some African lygosomine groups with this basically *Riopa*-like palate (African *Ablepharus*, with the exception of *A. boutoni*; African *Leiolopisma*; *Panapsis*; *Leptosiaphos*), a further specialization has been the deep posterior emargination of the palatal rami of the pterygoids.

The only other groups of skinks with both supranasals and a palatal pattern generally similar to that of *Mabuya* and *Eumecia* are the genera *Emoia* and *Eugongylus*. Although these two genera are closely related¹ and are very close relatives of *Mabuya*, it seems less likely that *Eumecia* has arisen from an *Emoia*-*Eugongylus* stock than from a *Mabuya* ancestry.

Eumecia has pterygoid teeth and a broad surface suture between the prefrontal and nasal bones while none of the 20 species of *Emoia* or 2 species of *Eugongylus* examined had pterygoid teeth or a broad prefrontal-nasal suture. Many *Mabuya*, on the other hand, have pterygoid teeth (17 of 30 species examined) and a broad suture between the nasal and prefrontal (12 of 23 species examined).

Eumecia also has only 9 teeth on the premaxillae whereas all the *Emoia* and *Eugongylus* studied have 11 or more (12) premaxillary teeth. However, only a few *Mabuya* (6 of 30 species

¹ The species of *Eugongylus* have also been treated as relatives of *Riopa* in the three most recent classifications dealing with lygosomine skinks. Boulenger (1887) referred the species of *Eugongylus* to the section *Riopa* of the genus *Lygosoma*. Smith (1937) recognized the taxon as a subgenus of *Riopa*, and Mittleman (1952) gave the taxon full generic rank. Again, the reasons for supposing that the relationships of *Eugongylus* lay in the direction of *Riopa* are as unclear to me as those for aligning *Eumecia* with *Riopa*. On the basis of skull morphology, partly discussed here, *Eugongylus* is strikingly similar to *Emoia*. This similarity and its taxonomic significance will be discussed elsewhere.

available) have 10 or more (11-12) teeth on the premaxillae, all others have 9 (or less frequently, 8).

Furthermore, *Eumecia* is live-bearing in its mode of reproduction, as are about half the species of *Mabuya* (10 of 21 species for which information is available). In contrast, the 17 species of *Emoia* and 2 species of *Eugongylus* for which the mode of reproduction is known are all egg laying (Greer, personal observation).

Emoia and *Eugongylus* do lack the postorbital bone, as does *Eumecia*, and although *Mabuya* invariably has a small postorbital, it seems most likely, on the weight of other evidence presented above, that *Eumecia* has lost the bone independently of its loss in *Emoia* and *Eugongylus*.

The present distribution of *Mabuya* and *Eumecia* certainly supports the derivation of *Eumecia* from a *Mabuya* ancestry. *Mabuya* has obviously been in Africa a long time — long enough to have evolved numerous and diverse species. Part of this diversity is manifest in the evolution of *Eumecia* — a “*Mabuya*” with reduced appendages. In that it is the only “*Mabuya*” to have lost the postorbital bone, and to have reduced the number of fingers and toes from the primitive number of 5-5, the taxon clearly deserves generic rank.

ACKNOWLEDGEMENTS

My thanks go first and foremost to Dr. Ernest E. Williams of the Museum of Comparative Zoology (MCZ) who has been most generous in his policies regarding the preparation of skulls from alcoholic specimens in the herpetological collections of the Museum.

The following people have also contributed greatly to the present study by making available to me skulls of species not represented, or only poorly represented in the Museum of Comparative Zoology collections: Dr. Charles M. Bogert and Dr. Richard G. Zweifel, American Museum of Natural History (AMNH); Dr. Alan E. Leviton and Dr. Steve C. Anderson, California Academy of Sciences (CAS); Dr. Robert F. Inger and Mr. Hymen Marx, Field Museum of Natural History (FMNH); Dr. Charles F. Walker, University of Michigan Museum of Zoology (UMMZ).

This study was supported in part by a grant from the Evolutionary Biology Fund which is administered for the National Science Foundation by the Evolutionary Biology Committee of the Biological Laboratories, Harvard University.

MATERIALS

Complete skulls of the following species have been examined.

RIOPA: *afer* (MCZ 41517, 41519, 71881); *bowringi* (1 from the series MCZ 26501, 26512); *fernandi* (MCZ 49696); *laeviceps* (MCZ 71889); *lineata* (AMNH 46379); *mabuiiformis* (MCZ 40267); *pembana* (MCZ 46106); *popae* (MCZ 44706); *punctata* (MCZ 3238); *sundevalli* (MCZ 41537, 41543); *tanae* (MCZ 40256); *vinciguerrae* (MCZ 17892); *albopunctata* (MCZ 8360).

EMOIA: *adspersa* (AMNH 29227); *atrocostata* (MCZ 15074, 15080, 26476, 26479); *boettgeri* (MCZ 22074); *callisticta* (MCZ 67203, 67308); *cyanogaster* (CAS 100684, MCZ 15121, 15135, 72278, 72287); *cyanura* (MCZ 14582, 14584, 14586, 75954, 75956); *flavigularis* (MCZ 65869); *kordoana* (MCZ 48603); *kuekenthali* (FMNH 134594); *loveridgei* (MCZ 49321); *maculata* (MCZ 49501, 49505 lot); *mivartii* (MCZ 73807, 75984); *nigra* (MCZ 15153, 15157, 67770, 72510, 72514, 72515, 72517, 72523, 75522); *pallidiceps* (MCZ 79856); *physicae* (AMNH 95772), *ruficauda* (MCZ 26482, 2 specimens, 26492); *sanfordi* (AMNH 40169); *submetallica* (AMNH 59015); *sorex* (MCZ 7705); *samoensis* (MCZ 16931).

EUGONGYLUS: *albofasciolatus* (MCZ 4097, 72703); *rufescens* (MCZ 49341).

EUMECIA: *anchietae* (MCZ 41557, 41562).

MABUYA: *aurata* (MCZ 56550); *bayoni* (MCZ 39731); *bensoni* (MCZ 22583); *binotata* (MCZ 22421); *blandingi* (MCZ 55171); *brachypoda* (MCZ 71410); *brevicollis* (MCZ 41306); *capensis* (MCZ 21433); *comorensis* (MCZ 24151, 2 specimens, 24155); *dorsovittata* (MCZ untagged specimen); *elegans* (MCZ 67954); *englei* (MCZ untagged specimen); *fasciata* (MCZ 37835+ 2 untagged specimens); *gravenhorsti* (MCZ 11609); *hildebrandti* (MCZ 70254, 70248); *lacertiformis* (MCZ untagged specimen); *longicaudata* (MCZ 25191); *mabuya* (CAS 71456, UMMZ 1047, MCZ 32040, 36617, 38935, 54201, 81182, 81184); *macrorhyncha* (MCZ 49551, 49552); *macularia* (MCZ 3926); *maculilabris* (MCZ 24820, 24821); *megalura* (MCZ 47611); *multifasciata* (CAS 60692 + 2 untagged specimens, UMMZ S 1830, 1831, MCZ 25198, 25199, 37843); *occidentalis* (MCZ 43180); *perretii* (MCZ 19711); *planifrons* (MCZ 85545); *polytropis* (MCZ 8103, 54559); *quinquetaeniata* (MCZ 52424, 2 specimens, 55179, 67838, 67840); *sulcata* (MCZ 21645); *varia* (MCZ 18658, 18668, 50823, 50824, 85543).

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(Received 14 April 1967.)

TABLE 1

Comparison of certain external scale (1) and skull (2-6) characters in the genera *Mabuya*, *Eumecia* and *Riopa* (*sensu* Smith's (1937) subgenus *Riopa* and Mittleman's (1952) genera *Riopa*, *Squamicilia* and *Mochlus* collectively).

<i>Mabuya</i>	<i>Eumecia</i>	<i>Riopa</i>
1. Prefrontal scales meet medially in about $\frac{1}{3}$ of the species.	Prefrontals meet medially.	Prefrontals always separated.
2. Palatal rami of pterygoids separated along midline of palate; no posteriorly projecting medial processes from the palatines (Fig. 1).	As in <i>Mabuya</i> (Fig. 1).	Palatal rami of pterygoids separated along midline of palate by posteriorly projecting medial processes from the palatines (Fig. 1).
3. 12 of 23 species examined with a surface suture between prefrontal and nasal bones to separate frontal and maxilla.	Surface suture between prefrontal and nasal bones to separate frontal and maxilla.	Only 2 of 13 species examined with a surface suture between prefrontal and nasal bones to separate frontal and maxilla.
4. 17 of 30 species examined have pterygoid teeth.	Pterygoid teeth present.	Only 1 (<i>R. bowringi</i>) species of 13 examined has pterygoid teeth.
5. 28 of 29 species examined have 20 or more teeth on the maxilla.	24-26 teeth on maxilla.	Only 4 of 13 species examined have 20 or more teeth on maxilla.
6. Small to minute postorbital bone present.	Postorbital bone lacking.	Postorbital bone lacking.